Assignment no. 4

http://www.cs.tau.ac.il/~danha/courses/rob02.html

due: July 2nd, 2002

Exercise 4.1 Let S be a set of n pairwise disjoint segments in the plane. In class we saw that S admits a separation sequence along any given direction $\vec{d}$, that is, there is an ordering of the segments in S: $s_1, s_2, \ldots, s_n$ such that the segment s_i can be translated to infinity in direction $\vec{d}$ without hitting any segment $s_j, j > i$.
(a) Given a set S of segments as above, design an efficient algorithm that will determine a separation sequence for S.
(b) Show that the any collection of pairwise disjoint convex polygons in the plane admits a separation sequence as above.

Exercise 4.2 (p) In this exercise you are required to use a (ready made) 3D collision-detection package to devise a path verification program. That is, given a robot and obstacles in 3-space, and given an input file with the location of the obstacles, and a description of a path for the robot, you will have to decide if the path is collision free. For more details see the TA's page (which will be completed soon—a message will be sent when it is ready).